II. "On the Anatomy of *Victoria Regia*." Part II. By ARTHUR HENFREY, Esq., F.R.S., F.L.S. &c., Professor of Botany in King's College, London. Received May 5, 1859.

(Abstract.)

This paper is a continuation of one published in the Philosophical Transactions for 1852 (p. 289), and discusses the general question of the anatomical structure of the stems of Monocotyledons and Dicotyledons, especially in reference to some objections taken against the author's views respecting the stems of the Nymphæaceæ. Certain peculiarities of the structure of roots are next examined, and these are shown to be formed on the Dicotyledonous type in *Victoria*.

The germination of the seed is described in a manner differing to some extent from the accounts given by Planchon, Trécul, and Hooker. The error of Trécul, in stating that the earlier leaves are devoid of a stipule, is shown to depend upon his overlooking the true axillary position of that organ.

The Phyllotaxy is next treated, with the development and arrangement of the leaves and roots; lastly, a complete history of the development of the flower, showing that the apparently inferior position of the ovary depends upon a great enlargement of the receptacle after the formation of the various organs forming the flower.

III. "On the Conductivity of Mercury and Amalgams." By F. CRACE CALVERT, Esq., and R. JOHNSON, Esq. Communicated by Professor STOKES, Sec. R.S. Received April 14, 1859.

(Abstract).

The object of the researches described in this paper, was to carry out with reference to amalgams the investigations relative to alloys contained in a former paper. In comparing the results of theory and experiment in the manner followed in the former paper, the conducting power of mercury itself was a constant, which it was essential to know. The figure given in the former paper was mercury=677, on the scale silver=1000. On adopting in the first instance this value of the conducting power of mercury, the results

obtained with alloys, which consisted mainly of mercury, appeared very anomalous; it seemed as if a very small per-centage of even the best conducting metals reduced immensely the conducting power of mercury. But it was suggested to the authors, that the apparently high conducting power of mercury obtained by their method, was probably due to the transference of heat by convection; that the real conducting power of mercury for heat was low, like its conducting power for electricity; that the other metal, contained in small quantity in the amalgam, acted by rendering the amalgam viscous, and thereby interfering with the transference of heat by convection, and that the low conducting power of mercury would show itself on merely inclining the vessel used in the experiment, so that the box containing the warm water should be higher than the other. Experiment confirmed this view. As the apparent conducting power of mercury was found continually to decrease with an increase in the inclination of the vessel, it was found necessary, in order to obtain correct results, to arrange so that the bar-shaped box containing the mercury or fluid amalgam was actually vertical in the experiment. In this way the authors obtained for mercury the figure 54, on the same scale as before. It is worthy of remark, that mercury comes out the worst conductor of all the metals tried, the figure for bismuth, which had previously been the lowest, being 61. This is in analogy with water, also a fluid, the conducting power of which is known to be excessively low. The conducting power of the more fluid amalgams determined by experiment with the box vertical, proved to be in all cases nearly the same as that of pure mercury, in conformity with the law mentioned by the authors in their former paper, that alloys in which there is an excess of the number of equivalents of the worse conducting metal, over the number of equivalents of the better conductor, do not sensibly differ in conducting power from the worse conductor alone. In the case of amalgams generally, the conducting power obtained by experiment was found to agree pretty closely with the number calculated from the per-centages and conducting powers of the component metals.

In conclusion, the authors give some further experiments on the conduction of heat by compound bars, formed of metals placed in some cases end to end in alternate cubes, in other cases side by side in parallel bars, extending the whole length of the compound bar.

Among bars of the latter kind, it was found that it was only in the case of bismuth and antimony that the compound bar conducted heat according to the calculated amount.

*May* 26, 1859.

Sir BENJAMIN C. BRODIE, Bart., President, in the Chair.

The following communications were read :—

I. "On the Intimate Structure, and the Distribution of the Blood-vessels, of the Human Lung." By A. T. H. WATERS, Esq., Lecturer on Anatomy and Physiology, Liverpool. Communicated by Dr. SHARPEY, Sec. R.S. Received April 7, 1859.

Having been recently engaged in investigating the anatomy of the human lung, I beg to lay before the Royal Society some of the results of my observations with respect to the arrangement of the ultimate air-tubes and the distribution of the blood-vessels of the organ.

The bronchial-tubes of the lungs, after several divisions and subdivisions, which for the most part are of a dichotomous nature, terminate in a dilatation, into which open a number of elongated cavities, which constitute the ultimate expressions of the air-tubes. These elongated cavities, to which various names have been given, I propose to call *air-sacs*, as being, in my opinion, more appropriate to their shape and arrangement than any term hitherto used; and the series of air-sacs connected with the extremity of each bronchial twig, with its system of blood-vessels, &c., I shall call a *lobulette*.

Every lobule of a lung is composed of a number of lobulettes, and thus the description of a single lobulette will suffice for that of the entire lobule.

Each lobulette consists of a collection of air-sacs, which vary in number from six to eight, ten or twelve. The air-sacs are somewhat elongated cavities, communicating with the dilated extremity of a bronchial tube by a circular opening, which is usually smaller than the sac itself, and has sometimes the appearance of a circular hole in a diaphragm, or as if it had been punched out of a membrane which